Docket #: Holmes.N-01

APPLICATION

Of

Ned W. Holmes

For

UNITED STATES LETTERS PATENT

On

Screeding Apparatus And Method

Sheets of Drawings: Six

TITLE: Screeding Apparatus And Method

BACKGROUND OF THE INVENTION

RELATED APPLICATIONS:

This application claims priority and is entitled to the filing date of U.S. Provisional application Ser. No. 60/419,349 filed Oct. 18, 2002, and entitled "Double Fin Auger." The contents of the aforementioned application are incorporated by reference herein.

INCORPORATION BY REFERENCE: Applicant(s) hereby incorporate herein by reference, any and all U. S. patents, U.S. patent applications, and other documents and printed matter cited or referred to in this application.

FIELD OF THE INVENTION:

This invention relates generally to concrete pad finishing machinery and more particularly to a surface finishing machine of the type providing a pull-off auger for reduction of the volume of concrete laying in a pour.

DESCRIPTION OF RELATED ART:

The prior art teaches the use of screeding apparatus and methods, see the Quenzi et al reference, U.S. 4930935, but does not teach such using an auger with double intertwined spiral flight coils as applied to leveling and surfacing a newly poured concrete pad or similar construction. The present invention fulfills these needs and provides further related advantages as described in the following summary.

SUMMARY OF THE INVENTION

The present invention teaches certain benefits in construction and use which give rise to the objectives described below.

A screed assembly apparatus for loose or plastic materials such as placed and/or poured, uncured concrete previously placed on the ground or another support surface, includes a screed frame, and mounted thereon, a striker for engaging and spreading the materials and a rotatable auger for moving the material longitudinally along the screed frame. The auger provides a pair of intertwined spiral flight coils. The striker is spaced to one side of the auger and in parallel thereto. An auger mounting means and a motive power means are engaged for rotating the auger to remove excess portions of the concrete from the pour. By using dual flight coils, contact with the concrete is doubled during the leveling process which provides significant improvement of the speed with which excess concrete may be removed and also improving flatness. Each revolution of the auger moves twice the volume of concrete of a single flight auger and leaves the surface of the concrete twice as smooth. This is an unexpected result of great importance. No double flight augers are in use in the present application in the United States, territories or possessions to your applicant's knowledge, although single flight augers have been used in the present application since at least 1990.

A primary objective of the present invention is to provide an apparatus and method of use of such apparatus that provides advantages not taught by the prior art.

Another objective is to provide such an invention capable of improved efficiency in removal of excess material from an uncured concrete pad, which allows significantly faster screeding.

A further objective is to provide such an invention capable of improving the surface finish of an uncured concrete pad.

Other features and advantages of the present invention will become apparent from the following more detailed description, taken in conjunction with the accompanying drawings, which illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the present invention. In such drawings:

Figure 1 is a perspective exploded view of the preferred embodiment of the invention;

Figure 2 is a perspective view thereof as assembled;

Figure 3 is a partial perspective view of a dual intertwined spiral auger thereof, defining one end thereof, the opposing end being identical thereto;

Figure 4 is a perspective view of the preferred embodiment as used in the art of concrete leveling;

Fig. 5 is a graphical representation of the surface finish results using a single coil auger known in the art; and

Fig. 6 is a similar graphical representation of the surface finish results using a dual coil auger of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The above described drawing figures illustrate the invention in at least one of its preferred embodiments, which is further defined in detail in the following description.

The present invention is a screed assembly apparatus 10 and method of its use for removing excess portions of a loose or plastic material such as is commonly placed and/or poured, as for instance, uncured concrete 20 poured on a support surface such as the ground. The use of such a device is well known, as described in U.S. 4930935 to Quenzi et al, but what is not known, is the use of a dual intertwined spiral auger 30 for such purposes. The apparatus comprises a screed frame 12, as best shown in Fig. 1. Mounted on the screed frame 12 is a striker 40 for engaging and spreading the concrete 20 and the rotatable auger 30 for moving the concrete 20 longitudinally along the screed frame 12. The auger 30 is a base cylinder 31 of approximately 5.5 inches in diameter and a length of between 8 and 12 feet, with a pair of intertwined spiral flight coils 34', 34" of ¼ inch coil steel and having a preferred height of about 1-7/8 inches and a spacing of about 4.5 inches and welded onto its outer surface 32, as best seen in Fig. 3. The auger is preferably made of steel. The screed frame 12 provides an auger mounting means 14, preferably pillow block 15, spacer 15' and end blocks 50, described below. The screed frame also provides a motive power means 16, preferably an electric or hydraulic motor, engaged with the end blocks 50 for rotating the auger 30. The motor 16 is mounted to plate 17, which is in turn mounted to frame 12 in such a manner as to enable the drive shaft (not visible) of motor 16 to engage the auger 30 at the end blocks 16. Both ends 36, 38 of the auger 30 are mounted to frame 12 in the same manner and with the same hardware. Details of this enablement are defined further in the Quenzi et al reference U.S. 4930935. Not shown in the figures is that the screed assembly apparatus 10 is mounted on a boom 5 of a mobile screeding machine 7 shown in Fig. 4 and as fully described in the Quenzi et al reference, which enables screed assembly apparatus 10 to be moved vertically to partially immerse the striker 40 and the auger 30, within the concrete 20 and further enables the screed assembly apparatus 10 to be moved through and across the

concrete 20. The striker 40 is spaced to one side of the auger 30 as is well shown in Fig. 2, and is mounted in parallel thereto. As the screed assembly apparatus 10 moves in the direction of arrow "A" in Fig. 2, the striker 40 acts as a doctoring blade which tends to level the surface of the concrete 20. The auger 30 follows the striker 40 as the screed frame 12 moves across the concrete 20 the auger 30 rotating to draw, or pull-out excess amounts of the concrete 20 so as to place the concrete surface 22 at a desired finished level. The direction of concrete pull-out is shown by arrow "B" and may be reversed by rotating the auger in the opposing sense. Frame 12 also may mount a vibratory compaction device 4 shown in Fig. 4, and well defined in the Quenzi et al reference. The know-how for preparing augers for the present application is well known, so that it is not necessary to teach the method of fabrication of a dual flight coil auger as it maybe easily extrapolated from the techniques of fabrication of a single flight coil auger.

As shown in Fig. 3, the screeding auger 30 comprises a cylindrical body 31 supporting on the outer surface 32 thereof, the dual intertwined spiral flight coils 34', 34" extensive between ends 36, 38 of the cylindrical body 31, as best seen in Fig. 3. the flight coils 34', 34" are preferably welded onto surface 32. A pair of end blocks 50 are fixed, preferably by welding them in place, in the ends 36, 38 of the cylindrical body 31. The end blocks 50 provide longitudinally extensive opposing rods 52 having means for keyed engagement 54 therein, preferably a Woodruff key slot. The motor 16 has a drive shaft, not visible in the figures, and the drive shaft is keyed to fit into the rods 52, as is well known in the art for mechanical motion drives.

The screeding method of the present invention includes mounting the striker 40 and the rotatable cylindrical body 31 in parallel on the screed frame 12, intertwining the dual spiral flight coils 34', 34" on the outside surface 32 of the cylinder 31 between ends 36, 38 of the cylinder 31; positioning the striker 40 spaced to one side of the auger 30 and in parallel thereto; positioning the auger 30 partially immersed in the uncured concrete 20; and rotating

the auger 30 for removal of an excess portion of the concrete 20 while drawing the auger 30 and the striker 40 in a lateral direction "A".

The method further includes the steps of fixing the pair of end blocks 50 in the cylindrical body 31, the extending opposing rods 52 from the end blocks 50 longitudinally, and engaging one of the keyed apertures 54 in one of the opposing rods 52 with the motive means 16 for rotating the auger 30.

In tests of the present invention using the method of the present invention and applying standard practice techniques have shown significant improvements in the art. Fig. 5 is a graph of surface finish of a concrete pad finished using a single coil auger as is well known in the art. The ordinate axis defines surface roughness while the abscissa axis defines the distance of measurement across the concrete pad that the auger has moved. It is noted that Fig. 5 shows a surface roughness of about 0.30 maximum peak-to-peak inches. Fig. 6 is an identical measurement and presentation of a concrete pad finished using the double coil auger of the present invention. It is noted that the surfaced finish here is about 0.18 maximum peak-to-peak inches, a reduction of about 40%, i.e., the surface is almost twice as smooth using the double coiled auger. Additionally, the amount of excess concrete 20 that is able to be removed per unit time from the poured pad is approximately double that of a standard single coil auger operated at the same rotational speed. It is further noted, that the rotational speed of both the single and double coiled augers in these tests were identical.

While the invention has been described with reference to at least one preferred embodiment, it is to be clearly understood by those skilled in the art that the invention is not limited thereto. Rather, the scope of the invention is to be interpreted only in conjunction with the appended claims and it is made clear, here, that the inventor(s) believe that the claimed subject matter is the invention.